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(54) **TECHNIQUES FOR MOBILE DEVICE CHARGING USING ROBOTIC DEVICES**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,020,958	A	6/1991	Tuttobene	
8,736,228	B1 *	5/2014	Freed	H02J 7/025 320/107
9,056,555	B1	6/2015	Zhou	
9,378,607	B1	6/2016	Wine et al.	
9,492,922	B1 *	11/2016	Johnson	B25J 9/161
2003/0234730	A1	12/2003	Arms et al.	
2009/0079388	A1	3/2009	Reddy	
2013/0030570	A1	1/2013	Shimizu et al.	
2013/0166069	A1	6/2013	Ikeda et al.	
2014/0022051	A1 *	1/2014	Levien	A61M 5/20 340/5.2

(Continued)

OTHER PUBLICATIONS

U.S. Appl. No. 14/673,744, filed Mar. 30, 2015, Titled: Techniques for Mobile Device Charging Using Robotic Devices.

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(57) **ABSTRACT**

A method, apparatus, and/or system for providing an action with respect to a mobile device using a robotic device that tracks the user. In accordance with at least one embodiment, a request to perform an action with respect to an electronic device is received. Information may be sent to one or more robotic devices within a proximity of the electronic device. A robotic device of the one or more robotic devices may be selected to perform the action. An indication may be received from the robotic device that indicates that the user has interacted with the robotic device. Instructions may be sent to the robotic device to perform the action with respect to the electronic device. A location of the user may be tracked while charging is performed by the robotic device. The robotic device may be instructed to follow the user at a threshold distance from the user.

24 Claims, 13 Drawing Sheets